

U.S. Application Serial No. 09/606,445

15. (not amended) The cellular telephone as in claim 14 further comprising:  
a cellular telephone housing formed of a conductive material; and  
a printed circuit board (PCB) having a metalized ground plane, the metalized ground plane and the grounded second helical antenna coupled to the cellular telephone housing.

16. (not amended) The cellular telephone as in claim 15 further comprising a monopole antenna coupled to the first helical antenna and tuned to a second resonant frequency of operation.

### REMARKS

The present amendment is in response to the Official Action dated September 12, 2002, wherein the Examiner rejected pending claims 1, 2, 6, 8, 11, 14 and 15, as being unpatentable over Tay et al., US Patent No. 5,563,615, either separately, or in view of Luzzatto, US Patent No. 5,799,246. Claims 3-5, 7, 10 and 16, are objected to only to the extent that they are dependant upon a rejected base claim. Claims 12 and 13 have been deemed to be allowable.

However contrary to the Examiner's assertions, the claims of the present application, as presently amended, are neither made known nor made obvious by the references relied upon by the Examiner. Consequently, contrary to the Examiner's assertions, all of the claims are in condition for allowance. Reexamination and reconsideration of the above-identified application, in view of the present amendments and corresponding remarks, are hereby requested.

Tay et al., '615, discloses a broadband antenna. The broadband antenna includes a first conductive means for resonating at a first frequency, where the first end of the first conductive means is coupled to a signal feed portion, and a second conductive means, shorter in length than the first conductive means for resonating at a second frequency, where the first end of the second conductive means is shorted to a ground portion.

Regarding claim 1, Tay et al., '615, fails to disclose a first or second element of a multi-band antenna, which both extend along a common linear axis, beside one another, that are independent of the grounded helical antenna, which surrounds the multi-band antenna.

Furthermore, contrary to the Examiner's assertions, relative to claim 6, Tay et al., '615, fails to disclose a grounded helical antenna, which includes a second section having a distance

U.S. Application Serial No. 09/606,445

between adjacent turns that is different than the distance between adjacent turns of a first section. More specifically, column 3, lines 25-33, of the cited reference, relates to the overall length in a lengthwise direction of the two different helixes (one of which is the grounded helix 12, while the helix is coupled to the RF signal 11). The reference is silent as to the distances between individual loops within the same (grounded) helix. The same is true relative to claim 14.

Regarding claims 2, 8, 11 and 15, while a cellular telephone housing, that is formed of a conductive material is acknowledged in the description, the corresponding portion of the description fails to provide for a metalized ground plane and the grounded helical antenna, which is coupled to the cellular telephone housing, in the context of the independent claims from which the claims depend. Consequently, contrary to the Examiner's assertions, claims 2, 8, 11 and 15 are not made obvious by the references in combination with the description of background material in the specification.

The applicant notes with appreciation, the indication of allowability of claims 12 and 13, and the allowability of claims 3-5, 7, 10 and 16, if they were rewritten to no longer depend upon a rejected base claim. Claim 3 has been rewritten to further incorporate the features of claim 1. However, when claim 3 was rewritten, the features of claim 2 did not appear to be necessary for purposes of providing any additional antecedent basis, relative to claim 1, and therefore the corresponding features were not included.

The claims, as presently amended, are allowable over the prior art of record, for the reasons noted above. Allowance of the application is respectfully requested.

Respectfully submitted,  
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U.S. Application Serial No. 09/606,445

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1 and 3 have been amended as follows:

1. (amended twice) A multi-band antenna apparatus comprising:  
a multi-band antenna including a first element, which extends along a linear axis, and a second element, which extends along the linear axis, beside the first element, the first and second elements having different resonant frequencies; and  
a grounded helical antenna surrounding the multi-band antenna.

3. (amended twice) [The] A multi-band antenna apparatus [as in claim 2 wherein the multi-band antenna comprises] comprising:  
a multi-band antenna including a helical antenna and a monopole antenna, the helical antenna and the monopole antenna having different resonant frequencies; and  
a grounded helical antenna surrounding the multi-band antenna.